PB86-133956

Superfund Record of Decision (EPA Region 5)
Northernaire Plating Company
Wexford County, Cadillac, Michigan
September 1985

(U.S.) Environmental Protection Agency
Washington, DC

11 Sep 85

U.S. Department of Commerce
National Technical Information Service
NTIS

United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R05-85/022
September 1985

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EPA

Superfund Record of Decision:

Northernaire, MI

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NATIONAL TECHNICAL
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U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

TECHNICAL REPORT DATA
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1. REPORT NO. EPA/ROD/R05-85/022	2.
3. RECIPIENT'S ACCESSION NO. PB86 133956/AS	
4. TITLE AND SUBTITLE SUPERFUND RECORD OF DECISION Northernaire, MI	5. REPORT DATE September 11, 1985
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460	10. PROGRAM ELEMENT NO.
	11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS Same as box 9.	13. TYPE OF REPORT AND PERIOD COVERED Final ROD Report
	14. SPONSORING AGENCY CODE 800/00

15. SUPPLEMENTARY NOTES

16. ABSTRACT

Northernaire Plating is the site of a former electroplating facility located at 1002 Sixth Street in Cadillac, Wexford County, Michigan. Electroplating operations were conducted at the 12.75 acre site from 1971 to 1981. Waste contaminants from electroplating commonly include copper, nickel, chromium, zinc, lead, tin and cadmium, as well as metal complexing agents. In 1978, two domestic wells were found to be contaminated with hexavalent chromium. In addition, process waste waters containing cadmium and chromium were discharged into the municipal sewer system. A private sewer line permitted exfiltration of these waste waters through poorly sealed joints. A drywell in the sewer line at the facility allowed plant effluent to be discharged directly to the highly permeable unsaturated soil.

This ROD is a source control remedial action that includes: excavation of soils and sewer line sediments to meet response objectives of 50 mg/kg chromium and 10 mg/kg cadmium, and disposal offsite at a RCRA facility; cleaning the floor of the facility of dust and residue; breaking-up a 30ft. X 10ft. area of the concrete floor and the drywell in the building, sampling the soil for cadmium and chromium, and excavation and disposal offsite at a RCRA facility, if necessary; and backfilling with uncontaminated soil. Any additional remedial actions will be addressed in a separate Record of Decision upon completion of the RI/FS. Total capital cost for the selected remedial action is estimated to be $75,000.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field Group
Record of Decision Northernaire, MI Contaminated Media: gw,soil,sewer sediments Key contaminants: Hexavalent chromium, cadmium, chromium		

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report) None	21. NO. OF PAGES 24
	20. SECURITY CLASS (This page) None	22. PRICE

EPA Form 2220-1 (Rev. 4-77) PREVIOUS EDITION IS OBSOLETE

RECORD OF DECISION

REMEDIAL ALTERNATIVE SELECTION

SITE: Northernaire Plating Company, Wexford County, Cadillac, Michigan

Documents Reviewed

I reviewed the following documents describing the analysis of cost-effectiveness of remedial alternatives for the Northernaire site:

- Focused Feasibility Study, Northernaire Plating, Cadillac, Michigan, Michigan Department of Natural Resources, July 1985
- Public comments and recommendations
- Responsiveness summary.

Description of Selected Remedy

° Excavate soils and sewer line sediments contaminated with cadmium and chromium to response objectives of 50 mg/kg chromium and 10 mg/kg cadmium, and transport them to a privately owned off-site RCRA subtitle C disposal facility.

° Clean the floor of the building of dust and residue which may contain hazardous substances.

° Break-up a 30 ft. x 10 ft. area of the concrete floor and the drywell in the building, sample the soil and if contaminated, excavate with a backhoe and dispose of as above.

° Backfill the excavated areas with uncontaminated soil.

° Cost of the proposed alternative is approximately $75,000.

Declarations

Consistent with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), and the National Contingency Plan (40 CFR Part 300), I have determined that the excavation and off-site disposal of contaminated soils and sewer line sediments around and under the building is a cost-effective remedy necessary to prevent or minimize the release of hazardous substances so they do not migrate or cause harm to public health, welfare and the environment. The State of Michigan has been consulted and agrees with the approved remedy.

I have also determined that the action being taken is consistent with remedial goals at the site, and is appropriate when balanced against the availability of monies for use at other sites. In addition, the off-site transport is more cost-effective than other remedial actions. The State is continuing its Remedial Investigation/Feasibility Study to determine the extent of groundwater contamination and the hydraulic

characteristics of the aquifers in order to evaluate potential remedial actions. If additional remedial actions are determined to be necessary, a Record of Decision will be prepared for approval of the future action.

Sept. 11th, 1985
Date

Valdas V. Adamkus
Regional Administrator

Summary of Remedial Alternative Selection
Northernaire Plating Company
Cadillac, Michigan

Site Location and Description

Northernaire Plating is a former electroplating facility located at 1002 Sixth Street in Cadillac, Wexford County, Michigan (see Figure 1). Operations were conducted in a 5000 sq. ft. building located on 12.75 acres.

Soils in the area are glacio-lacustrine in origin and have alternating layers of highly permeable sands and gravels, and less permeable layers of clayey and silty lacustrine deposits. There are three aquifers. The stratigraphy consists of three sand layers separated by two clay layers. Little is known about the deep aquifer (300 ft.) where the municipal well field located 1500 feet N.E, draws its water. The intermediate aquifer flows in a northwest direction while the shallow aquifer flows toward the northeast. The two upper aquifers merge north of the site.

The site is located in an area of both industrial and residential properties and is relatively flat with a relief of three feet across the 12.75 acres. The population of Cadillac, Michigan, is approximately 10,000. This population has a potential to be impacted by the site because they are served by area groundwater. The municipal wellfield lies to the northeast of the site and North Park subdivision lies directly to the north. This subdivision draws its water from private wells. The wells are uncontaminated at this time.

Site History

In 1978 two domestic wells, two blocks from the Northernaire facility, were found to contain hexavalent chromium in their water supply. This discovery eventually led to the placement of the facility on the National Priorities List (NPL) on July 23, 1982. The facility was in operation from 1971 to 1981. The property is owned by R.W. Meyer, Inc., and the facility was owned and operated by Northernaire Plating Company, Inc., and Willard Garwood. The assets were sold to Top Locker, Inc., in June, 1981.

Electroplating operations conducted at Northernaire included flash chrome, hard chrome, bright nickel, bright chrome, sulfomate nickel, black oxide, electroless nickel, and rack and barrel zinc. Waste contaminates from such operations commonly include copper, nickel, chromium, zinc, lead, tin and cadmium as well as metal complexing agents.

Process waste waters containing cadmium and chromium were discharged to the municipal sewer system from 1971 to 1978. A private sewer line permitted exfiltration of these wastes waters through poorly sealed joints. A drywell in the sewer line at the facility allowed plant effluent to be discharged directly to the highly permeable unsaturated soil. A floor

FIGURE 1

SITE LOCATION MAP
NORTHERNAIRE PLATING CO.
CADILLAC, MICHIGAN

E.C. JORDAN CO.

drain, inside the building, is connected to a second dry well which allowed direct discharge to the soil. Air quality control equipment, located on the pad toward the northern end of the building, is connected to ductwork from the chrome plating area inside the building. This ductwork is highly corroded and stains on the pad and soil samples adjacent to the pad suggest this was a pathway for environmental contamination along with the sewer line and drywells at the Northernaire facility.

On July 5, 1983, the EPA initiated a removal action which lasted until August 3, 1983. During that time, 3450 gallons of acids, 5402 gallons of cyanide wastes, 160 drums of cyanide wastes and 5000 gallons of waste hypochlorite (used to decontaminate for cyanide during the cleanup) were removed from the site. One hundred twenty feet of the private sewer line were also removed and the building was steam cleaned. This action was initiated as a result of the contaminated material entering the groundwater and infiltrating two private wells near the site.

Current Site Status

In 1978, hexavalent chromium in the groundwater, believed to have originated at the Northernaire site, was detected by the Health Department District No. 1, in water supply wells of two homes near the site. The concentrations were 2.8 and 3.8 mg/l (ppm) which were significantly higher than the drinking water standard of 0.05 mg/l (ppm). The city of Cadillac extended city water service to these homes. During this investigation, hexavalent chromium was detected in the groundwater at a concentration of 0.93 mg/l (ppm) at a depth of 150 ft. Phase II of the Remedial Investigation (RI) report, published by E.C. Jordan Co., in May 1985 shows this contamination is about 1400 ft. north of the site. Additional investigation is necessary to determine the boundaries and implications of this plume.

The portions of the RI which address soil contamination include:

- sampling of surficial and near surficial soil
- sampling of sediments in manholes of sewers
- soil sampling from deep borings in the unsaturated zone.

Surface samples were taken from the upper 6 inches of soil; shallow-samples were taken from depths of less than 5 feet; intermediate samples were collected between 5 and 15 feet; and deep samples were taken at depths greater than 15 feet.

The results of these samples showed surface and subsurface soil contamination is concentrated around the building and in sewerline sediments along the sewerline and in the area of the drywell.

Of the 70 soil samples submitted for analysis 19 exhibited concentrations above the selected screening levels for cadmuim and chromium. The screening level for cadmium is 10 mg/kg (dry weight), the federal limitation for cadmium in land disposal of wastewater sludge. The screening level for chromium is 50 mg/kg (dry weight) the conservative end of the suggested range for land application of sludges containing chromuim according to Michigan guidelines (See Table 1).

TABLE 1

SOIL SAMPLE ANALYTICAL RESULTS ABOVE THE SCREENING CRITERIA AND APPLICABLE STANDARDS

Location of Samples

Analysis	Surface Soils			Test Pits			Split Spoon			Sewer Sediment		
	Sample Designation	Total Metals	E.P. Toxicity	Sample Designation	Total Metals	E.P. Toxicity	Sample Designation	Total Metals	E.P. Toxicity	Sample Designation	Total Metals	E.P. Toxicity
Total Cadmium mg/kg (ppm)	SS-001	10	*110/100							MH	1580	3600
	SS-002	10	140							MH-A	1930	3400
	SS-009	10								S	2750	8400
	SS-003	460	1400								---	---
Total Chromium mg/kg (ppm)	SS-001	15	<10/<10	5-3	53	26	SPT-1-5	29	<10			
	SS-002	16	<10	5-3A	37	13	SPT-2-1	91	61			
	SS-003	161	<10	5-6	11	47	SPT-2-10	27	28	MH	2030	94
	SS-004	13	<10							MH-A	3210	<10
	SS-005	13	<10							S	2190	224
	SS-008	23								PHD-3	14	270
	SS-009	499								PHD-3S	2190	43760
	SS-013	11	<10									
	SS-017	10	<10									
	SS-018	36	57									
	SS-018S	35	<10									
	SS-022	25	<10									

Applicable Standards

Analysis	Safe Drinking Water Act	Clean Water Act, Water Quality Criteria for Human Health, Fish and Drinking Water	Clean Water Act, Water Quality Criteria for Human Health and Drinking Water Only	Michigan Municipal Sludge Management Program May, 1982		Federal Limitation Land Disposal of Wastewater Sludge
				Non-Restricted	Slightly Limited	
Total Cadmium mg/kg (ppm)	0.01 mg/l	10 µg/l	12 µg/l	5 mg/kg	5-25 mg/kg	10 mg/kg
Total Chromium mg/kg (ppm)	0.05 mg/l	50 µg/l	50 µg/l	50 mg/kg	50-1000 mg/kg	

Notes: 1) * 110/100: Sample value/duplicate value.
2) The significance criteria used was: 10 mg/kg total chromium or total cadmium.

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Five of these samples showed concentrations of cadmium and chromium to exceed the Extraction Procedure (EP) toxicity test. This is one test which determines if a solid waste is considered a hazardous waste under the Resource Conservation and Recovery Act (RCRA) (values greater than 1.0 mg/l cadmium or 5.0 mg/l chromium in the test extract under RCRA regulations (40 CFR Part 261.24)). (See Figures 2 and 3 for soil sample locations and Table 1 for a summary of soil sample results and applicable standards).

The elevated values of contamination occur primarily along the west side of the building where the pad is located and in the vicinity of the former drywell in the sewer line immediately to the north of the building. Leachate concentrations from the EP toxicity test for cadmium range from 1.4 mg/l to 8.4 mg/l. The leachate concentrations for chromium were detected up to 43.76 mg/l.

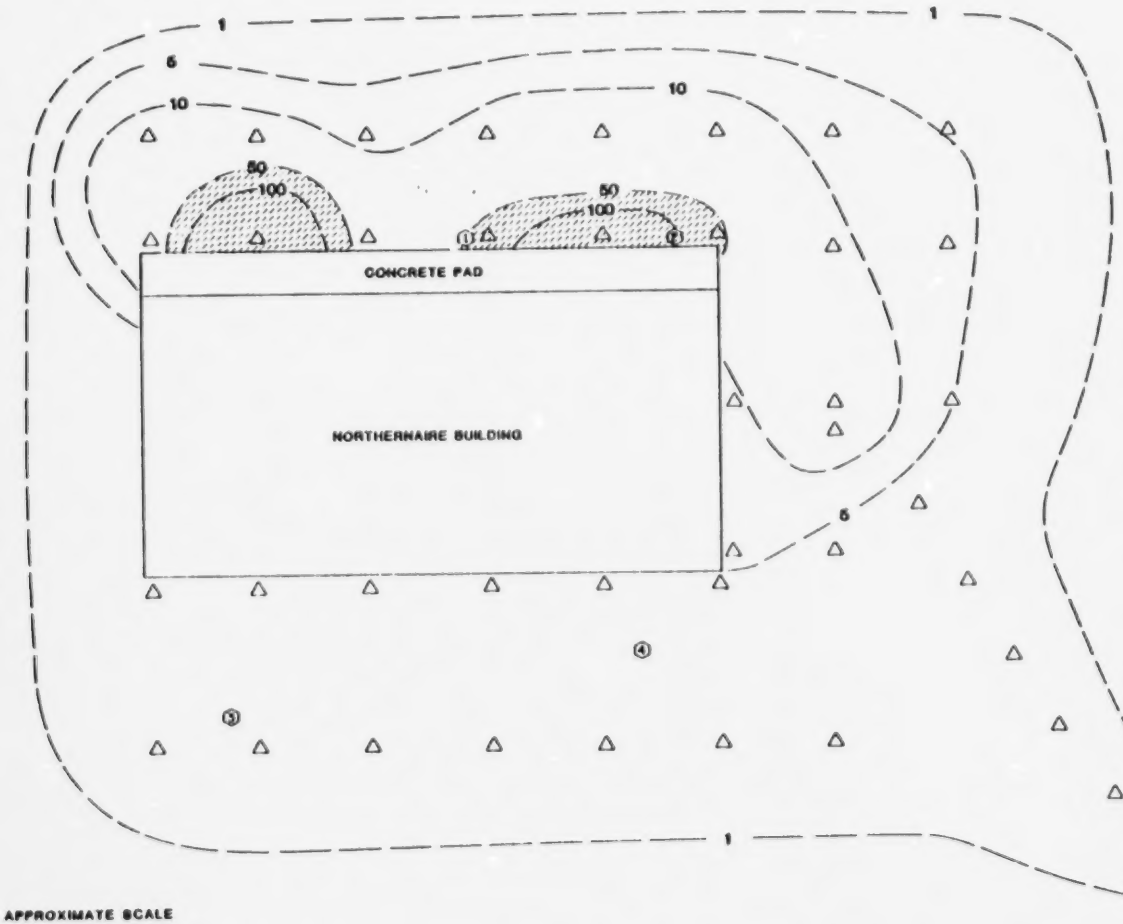
In order to estimate the concentrations of chromium and cadmium that may be left in the soil, a vertical and horizontal spread (VHS) model was used. The model uses the leaching potential of the metals as an indication of their mobility through the soil as they enter the groundwater and predicts their concentrations at the point of initial impact and at specific distances downgradient. The model has been used by EPA in evaluating the possible impacts of wastes for land disposal [40 CFR Part 261 as explained in 50 Fed. Reg. 7882 (Feb. 26, 1985)]. The model incorporates several worst case assumptions such as saturated soil conditions providing zero attenuation and no precipitation for metals, continuous toxicant input to an underlying aquifer at the maximum extract level, and a receptor well precisely in line with the source and direction of groundwater flow. Using the response objectives of 50 mg/kg chromium remaining in the soil, the model predicts that the concentration of chromium in the groundwater 10 meters away from the facility would be .02 mg/l (primary drinking water standard is .05 mg/l). For cadmium, the model predicts a concentration of .01 mg/l at a 10 meter distance with residual soil concentrations of 10 mg/kg. The primary drinking water standard for cadmium is .01 mg/l.

Applying the model to the site, when the EP toxicity test concentrations were used in relationship with existing concentrations of metals in the soil, an estimated chromium concentration of .14 mg/l resulted at a distance of 10 meters (three times the standard). Similarly, cadmium remaining in the soil predicted a concentration of 0.25 mg/l at a distance of 10 meters (twenty-five times the standard). These results support the need to undertake a source control remedial action and similarly support the choice of the response objectives. Although this model predicted groundwater contamination based on no remediation it should be noted that no contaminants were found at these levels in the groundwater at this site. These model values represent the worst case contamination of the groundwater under a No Action alternative.

Toxicity of Contaminants

Hexavalent chromium is manmade and toxic. It is used in various industrial processes such as plating parts. Evidence has shown that large doses can cause toxic reactions through ingestion and inhalation. Hexavalent chromium has been observed to cause lung cancer and a variety of respiratory complications in humans after it has been inhaled.

Cadmium is also used in the electroplating process. Long term effects of low levels of cadmium can result in a total or partial loss of smell, coughing,



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NOTES:

1. CONCENTRATIONS ARE OF TOTAL CHROMIUM IN mg/kg (ppm)

2. MAXIMUM CONCENTRATIONS AT A LOCATION REGARDLESS OF DEPTH. CONCENTRATION WITH DEPTH A TYPICALLY DECREASING FUNCTION. ESTIMATED DEPTHS OF CONCENTRATION RANGES BASED ON DATA ARE:

100+ ppm	0-1 FOOT
60-100 ppm	TO 6 FEET DEEP
10-60 ppm	TO 10 FEET DEEP
6-10 ppm	TO 16 FEET DEEP
1-6 ppm	TO 26 FEET DEEP

LEGEND

—5— CONCENTRATION CONTOUR FOR CHROMIUM IN ppm

△ SURFICIAL SOIL SAMPLE LOCATIONS

① SPLIT SPOON SAMPLE LOCATIONS

RECOMMENDED AREAS FOR EXCAVATION TO FIVE FEET AND DISPOSAL

APPROXIMATE SCALE

0 20 40 FEET

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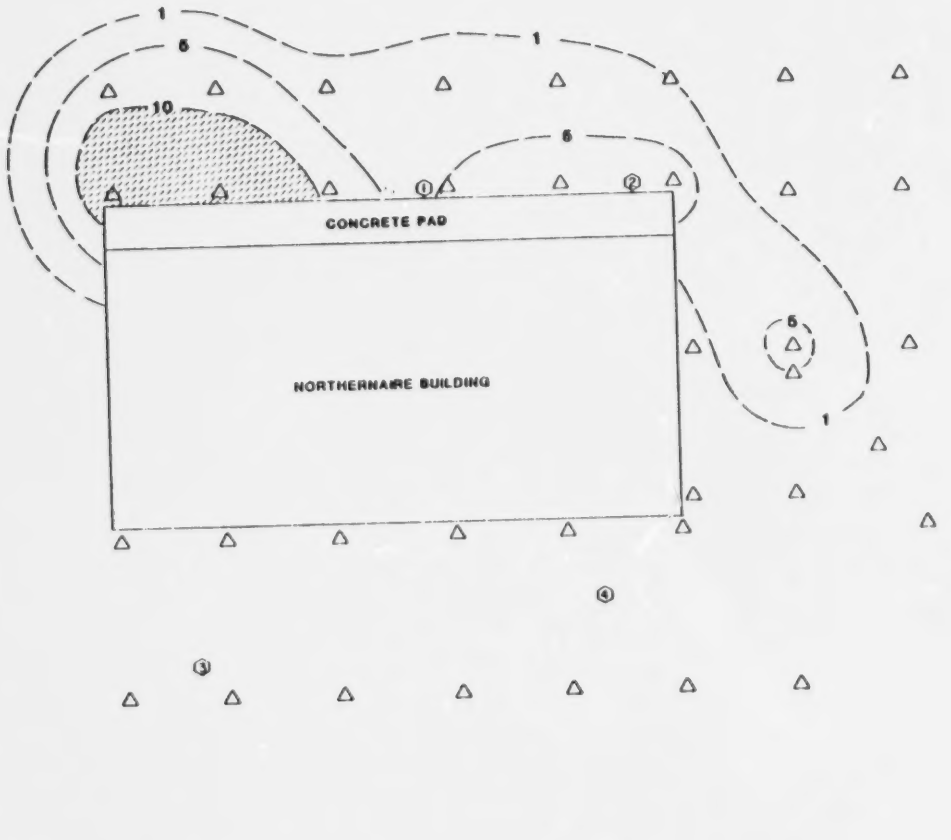
FIGURE 2

INTERPRETIVE CONTOURS OF CHROMIUM CONCENTRATIONS IN SOILS
NORTHERNAIRE PLATING CO.
CADILLAC, MICHIGAN
E.C. JORDAN CO.

BASE MAP PROVIDED BY KECK CONSULTING SERVICES, INC., JANUARY, 1986



NOTES:

1. CONCENTRATIONS ARE OF CADMIUM IN mg/kg (ppm)

2. MAXIMUM CONCENTRATIONS AT A LOCATION REGARDLESS OF DEPTH. CONCENTRATION WITH DEPTH A TYPICALLY DECREASING FUNCTION. ESTIMATED DEPTHS FOR CONCENTRATION RANGES BASED ON EVALUATION OF DATA ARE:

100- ppm	0 TO 1 FOOT
10-100 ppm	TO 2 FEET DEEP
5-10 ppm	TO 3 FEET DEEP
1-5 ppm	TO 5 FEET DEEP

LEGEND

—10— CONCENTRATION CONTOUR FOR CADMIUM IN ppm

△ SURFICIAL SOIL SAMPLE LOCATIONS

① SPLIT SPOON SAMPLE LOCATIONS

RECOMMENDED AREA FOR EXCAVATION TO TWO FEET AND DISPOSAL

APPROXIMATE SCALE

0 20 40 FEET

BASE MAP PROVIDED BY KECK CONSULTING SERVICES,INC.,JANUARY, 1988

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FIGURE 3

INTERPRETIVE CONTOURS OF CADMIUM CONCENTRATIONS IN SOILS
NORTHERNAIRE PLATING CO.
CADILLAC, MICHIGAN

E.C.JORDAN CO.

difficulty in breathing, loss of weight, yellowing of teeth, caries, generalized irritability, gastrointestinal upset, low level of blood hemoglobin and proteinuria. Evidence has shown that large doses can cause toxic reactions through ingestion and inhalation. Cadmium is a suspected carcinogen.

Threat to Public Health

Based on the above information, it is estimated that 230 cubic yards of soil and 10 cubic yards of sewer line sediment are contaminated. An additional 15 cubic yards under the building may also be contaminated. (See figure 4).

The potential receptors for the contaminants in the soil at the site are local residents and animals and any living organism who might ingest the contaminants in the soil. Toxic metals can be concentrated by biological activity to lethal concentrations as they are passed up the food chain. As such, the release of contaminants in the soils at the site, and the threat of future releases, warrants this source control measure.

Enforcement

The U.S. EPA filed a CERCLA Section 107 cost recovery action against three potentially responsible parties (PRPs), R.W. Meyer, Inc., Northernaire Plating Company and Willard S. Garwood, to recover funds expended as a result of the Immediate Removal Action. That action is currently pending. Additional cost-recovery action may be expected as future remedial work is completed at the site. These PRPs were contacted regarding this operable unit, and did not respond within the time limitations of the notice letter.

Alternative Evaluation

A Focused Feasibility Study (FFS) of proposed source control measures for the Northernaire site was completed by E. C. Jordon Company and submitted for public review and comment on July 22, 1985. This project is a State lead, being conducted through a cooperative agreement with the State of Michigan Department of Natural Resources. The following objectives were developed as a result of the study.

- Prevent or minimize the source of groundwater contamination.
- Prevent or minimize direct contact hazards associated with surface and subsurface soil and sewer line sediments.
- Select a final disposition for the building which is compatible with the selection of the site remedy.
- Prevent future use of the floor drain and sewer line.

The FFS developed fifteen alternatives based on these objectives. Eleven relate to soil and four relate to the building (See Table 2). These alternatives and objectives were developed in accordance with the National Contingency Plan (NCP).

After the initial screening, five alternatives relating to soil and four relating to the building were judged to meet the objectives of source control and were assessed based on the following parameters:

FOCUSED FEASIBILITY STUDY REPORT PROBLEMS DISCUSSED

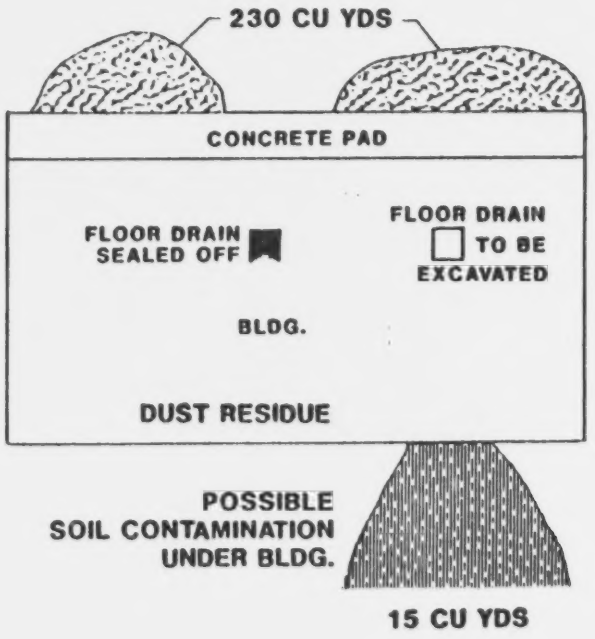

Figure 4

TABLE 2

SUMMARY OF INITIAL SCREENING OF ALTERNATIVES

Site Problem	Response Action	Remedial Technology Considered	Initial Screening: Acceptable Engineering Practice	Initial Screening: Effectiveness	Costs
1. Contaminated soils and sewer sediments	- No action	Monitoring and analysis, fencing and posting	Feasible	Marginally meets relevant Standards	$ 188,000
	- On-site	RCRA closure capping	Feasible	Not to relevant Standards	$ 180,000
		Collection drains	Infeasible	---	
		Barrier walls	Infeasible	---	
		RCRA Subtitle C facility	Feasible	Meets relevant Standards	$ 450,000
	- Offsite Disposal	RCRA Subtitle C facility	Feasible	Meets relevant Standards	$ 51,000
	- Treatment	Solidification/fixation	Feasible	Meets relevant Standards	$ 79,000
		Flushing	Infeasible	---	
		Incineration	Infeasible	---	
		Biological	Infeasible	---	
		Landfarming	Infeasible		
2. Building and Drywell	No action	Fencing, posting, boarding-up	Feasible	No applicable standards	$ 21,000
	- Complete Removal	Demolish the building and dispose of all or portions as a hazardous waste. (The remainder to be disposed of as construction debris.)	Feasible	No applicable standards	$ 44,000 40,000
	- Limited Modification and Continued use of building	Excavate drywell contents. Decontaminate building and dispose of contaminated rinsewaters and soils.	Feasible	No applicable standards	$ 21,250
	- Containment	Modify building to be used as a containment structure for permanent storage of contaminated soils and sediments.	Feasible	No applicable standards	$ 116,000

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1) level of protection; 2) reliability; 3) implementation; 4) cost; 5) constructability; 6) volume reduction; and 7) adverse environmental impacts.

Table 3 summarizes these alternatives.

TABLE 3

Contaminated Area	Remedial Action Alternative
Soil and Sewer line Sediments	° No action ° Site capping ° On-site Subtitle C facility ° Off-site disposal ° Solidification/fixation
Building	° No action ° Complete removal ° Limited Modification ° Containment

Soil and Sewer Line Sediment

Alternative 1 - No Action

A No Action Alternative of fencing and posting signs would afford marginal protection for direct contact but would not meet RCRA guidance. If this alternative is selected, there will be no protection to public health and the environment. In addition, danger exists of microorganisms or small animals bioaccumulating the contaminants and introducing them into the food chain. Site fencing and posting of signs are routinely implemented at hazardous waste sites and the reliability is moderately high. Installing a fence around the entire site and posting signs will take about three to four weeks.

Cost for Alternative 1 - No Action

Capital Costs	$64,000
O&M	N/A
Present Worth	64,000

Alternative 2 - Site Capping

Alternative 2 calls for a RCRA closure capping system to be placed over approximately 920 sq. ft. of contaminated material on site. The site would be revegetated, sloped and graded to promote and control surface runoff. Technical compliance with RCRA would be met.

The technology for implementing RCRA caps is a common technical practice. Long term reliability of a closure cap is determined by the effectiveness of the maintenance program. It is subject to loss of integrity due to weathering, breaching by vegetation or deterioration through neglect. The threat to groundwater would not be eliminated because of lateral migration. The site lies on permeable sands and gravels which are not conducive to capping. In addition, capping will cost approximately five or six times more than some of the other alternatives. A RCRA cap may be constructed in about 2 months.

Cost for Alternative 2 - Site Capping

Capital Costs	$129,000
Annual O&M	19,700
2-year Present Worth	163,199
30-year Present Worth	314,712

Alternative 3 - On-Site RCRA Subtitle C Disposal Facility

Disposal of contaminants in an on-site land disposal facility complying with applicable RCRA Subtitle C requirements is the most comprehensive of the containment options. The facility would remove the hazardous material from the environment at the site giving a very high level of protection to people and animals, provided failure of the cap or liners does not occur. Long term groundwater monitoring and inspection of leak detection systems would be part of the operation and maintenance program. The fact that the site lies on permeable sands and gravels must be considered when evaluating this alternative. The cost is five or six times greater than some of the other alternatives. Technology for RCRA landfills is commonly used by contractors familiar with hazardous waste site cleanups and can be implemented in approximately 2 months. Technical compliance with RCRA would be met.

Cost for Alternative 3 - On-Site RCRA Subtitle C Disposal Facility

Capital Costs	$139,000
Annual O&M	19,700
2-year Present Worth	173,199
30-year Present Worth	324,712

Alternative 4 - Off-site Disposal

Off-site disposal would involve excavating contaminated soil and transporting it to a privately owned off-site RCRA Subtitle C facility. This option would eliminate the possibility of future environmental degradation from this source at this site which makes it highly reliable. Two facilities have been identified which are permitted to receive inorganic metal wastes. The first is Wayne Disposal, Inc., # 2 Landfill, Belleville, Michigan, 200 miles from the site. The other is Fondessy Enterprises, Inc., Oregon, Ohio, 230 miles from the site. Both facilities were found by the State regulatory agencies to have no Class I RCRA violations and were inspected within the past six months. This kind of work is commonly done and easily implemented. There are no adverse impacts connected with this alternative; however, a possible hazard would exist in the event of an accident during transportation.

Capital Costs	$53,000
O&M	N/A
Present Worth	53,000

Alternative 5 - Solidification/Fixation

Solidification/fixation will transform hazardous material into a non-leachable form or create a material which is easier to handle. The process consists of soil excavation, mixing and curing to form the new material, and placement and/or disposal. These processes are appropriate for hazardous materials containing metals. Pilot tests must be performed in the field to

determine mix proportions. The technology is considered reliable provided a site-specific mix design and quality control program is developed and properly implemented. Treated materials will undergo RCRA hazardous wastes testing to determine if the materials have been rendered non-hazardous. If not and the material must be removed to a RCRA Subtitle C landfill, additional costs will be incurred which are not included in the cost summary.

Capital Costs	$79,000
O&M	N/A
Present Worth	79,000

Building

Alternative 1 - No Action

The No Action alternative for the building involves securing the building, fencing and posting. This alternative provides a lower level of protection than some of the other alternatives. Vandalism and forced entry is a common problem of boarded-up buildings. In addition, there is no provision for securing the drywell and possibly contaminated soil beneath the building. Some adverse impact may occur if metals leach out from this soil. The technology is simple and may be implemented in one to two weeks.

Costs for Alternative - 1 No Action

Capital Costs	$6,000
O&M	N/A
Present Worth	6,000

Alternative 2 - Complete Removal of the Building

Complete removal of the building provides for demolition of the building and disposal of demolition debris. This alternative allows the breaking up of the floor and access to any contamination in the unsaturated zone that may have seeped from the floor drain drywell, but does not allow for management of this soil. If high concentrations of contaminants were found upon testing the soil, excavation to an off-site Subtitle C facility or capping would be appropriate. The technology is proven and reliable. The costs are divided into two tables, on-site disposal and off-site disposal. Soil disposal under the building was not costed out because the handling of this material will depend on the alternative chosen for soil and sewer line sediment.

Costs for Alternative 2 - Complete Removal of the Building

On-site Disposal		Off-site Disposal	
Capital costs	$ 44,000	Capital costs	$40,000
Annual O&M	19,700	O&M	N/A
2-Year Present Worth	78,199	Present Worth	40,000
30-Year Present Worth	229,712		

If this alternative is combined with on-site disposal for soil and sewer line sediment, O&M costs will be incurred only once.

Alternative 3 - Limited Modification

Limited Modification allows the dust and residue on the floor to be vacuumed and if hazardous disposed of as a hazardous waste. A 30 ft. x 10 ft. portion of the concrete floor and the dry well will be broken-up to expose the possibly contaminated soil beneath the building. It is estimated about 15 cubic yards of soil may be contaminated in that area. If so, the wastes would be disposed of in a Subtitle C landfill. If the capping alternative is chosen for the soil and sewer line sediment, the soil under the building would be included.

Fifteen cubic yards of clean soil will be removed to reach the subsurface contaminated soil under the building. This clean soil, along with clean fill, will replace the excavated soil, and the floor will be covered with gravel at the completion of the operable unit and replaced with concrete at the time of the final remedy. This alternative is consistent with the final remedy and protects public health and the environment. The technologies required for this alternative are established and reliable.

Cost for alternative 3 - Limited Modification

Capital costs	$21,250
O&M	N/A
Present Worth	21,250

Alternative 4 - Containment

Renovating the building to be used as a containment structure for the soil and sewer sediment would involve constructing a vault inside the building with cemented cinder or concrete blocks. The technology is available and easily implemented.

An assessment would be needed for the possible contamination under the building. If the containment system failed, the contaminants inside the vault would remain a threat to public health and the environment. About two months would be needed to meet response objectives. Applicable requirements of RCRA would be met.

Costs for Alternative 4 - Containment

Capital Costs	$ 97,000
Annual O&M	18,300
2-year Present Worth	128,769
30-year Present Worth	269,514

Summary

The No Action Alternative for Soil and sewer line sediment does not prevent continued leaching of contaminants into the groundwater. It would take 475 years for chromium and 325 years for cadmuim, before the concentrations in the surficial soil would reach the response objectives of 10 mg/kg dry weight of cadmium and 50 mg/kg dry weight of chromium through natural flushing, therefore this alternative will not remove the danger to public health and the environment. For these reasons the No Action Alternative was eliminated.

In evaluating alternatives for a site closure cap and on-site disposal, a consideration must be given to the fact that the site is located on highly permeable sand and gravels which could significantly reduce effectiveness and protection. The cost of a site closure cap and on-site disposal for soil are five and six times greater than those for the remaining alternatives with no additional level of protection. These alternatives were eliminated on these bases.

Alternatives 4 and 5, Off-site disposal and Solidification/fixation for soil are technically feasible and relatively close in cost. Both are equally protective of public health and the environment if the solidification/fixation process is successful. Excavation for off-site disposal will take about two weeks, but actual disposal time will depend on the receiving facility. The amount of material needed to be moved to an off-site facility is small, so it will not significantly impact the capacity of that RCRA receiving facility. The time involved for solidification/fixation cannot be determined until pilot testing is completed. In addition, the long term effectiveness of this alternative has not been proven. It is not likely vendors will bid on a job for solidification/fixation for the small amount of materials to be treated at Northernaire. They have indicated transportation costs and costs for setting up equipment will not be cost effective. If this alternative is selected, delisting procedures must be followed.

The No Action Alternative for the building does not provide for securing the dry well and possibly contaminated soil under the building. This alternative provides a marginal level of protection compared to the other alternatives and on that basis was eliminated. The Containment Alternative provides limited protection from the soil under the building leaching into the groundwater. The cost of containment is an order of magnitude higher than some of the other alternatives for the building. For these reasons it was eliminated. The remaining alternatives provide adequate protection and are more cost effective. The Complete Removal and Limited Modification Alternatives provide comparable levels of protection at similar costs. If the Complete Removal Alternative is selected and the floor is left intact, contaminants would have a potential to reach the groundwater and microorganisms may continue to bioaccumulate the toxins into the food chain.

Community Relations

Copies of the FFS were made available to the public on July 22, 1985. The Cadillac Municipal Complex and the Cadillac Wexford Library served as repositories for this document. The MDNR issued a press release in the Cadillac Evening News on July 15 announcing the commencement of the three week comment period and schedule for a public meeting.

The meeting was held on July 30, 1985, at the Municipal Building in Cadillac, MI. Approximately 25 residents attended the meeting. Representatives of the EPA, MDNR, MDPH, E.C. Jordan Company and the local government were present.

Table 4
Summary of Alternative Analysis

Screening Parameters	Reliability	Level of Protection	Adverse Environmental Impacts	Capital Costs	Annual Operation Maintenance	Present Worth 30 yrs.
Soil						
No Action	Not Reliable	Prevents direct contact. Does not meet intent of RCRA	Impacts to G.W. and biota	$ 64,000	0	$ 64,000
Site Cap	Moderate	"	"	129,000	19,700	314,712
On-Site Disposal	Reliable	Meets RCRA Guidance	None	139,000	19,700	324,712
Off-Site Disposal	Reliable	"	None	53,000	0	53,000
Solidification	To be determined by pilot test. Expect High	To be determined by pilot test. Expected to exceed RCRA standards.	None	79,000	0	79,000
Building						
No Action	Not Reliable	Less than RCRA protection	Possible impacts to G.W. and boita	6,000	0	6,000
Complete Removal	High	Meets RCRA	None	*44,000/ 40,000	19,700/ 0	229,712/ 40,000
Limited Modification	High	"	None	21,250	0	21,250
Containment	Moderate	Exceed RCRA	None	97,000	18,300	269,514

* On-Site/Off-Site

Questions from local citizens were addressed. These citizens were interested in the progress that has been made and plans for the future. They asked questions about implementation and cost recovery. The public comment period ended August 12, 1985. Responses to written comments are in the Responsiveness Summary, attached.

Consistency with Other Environmental Requirements

Off-site activities will be in accordance with the appropriate RCRA and Department of Transportation (DOT) regulations for the transportation and disposal of hazardous wastes. This will include manifesting of wastes and shipment to a RCRA approved facility.

Recommended Alternative

The National Oil and Hazardous Substances Contingency Plan (NCP) [40 CFR Part 300.68(j)] states that the appropriate extent of remedy shall be determined by the lead agency's selection of the remedial measure which the agency determines is cost-effective (i.e., the lowest cost alternative that is technologically feasible and reliable) and which effectively mitigates and minimizes damage to and provides adequate protection of public health, welfare, or the environment. Based on the evaluation of the cost and effectiveness of each proposed alternative, the comments received from the public and the MDNR, the following alternative has been determined to be cost-effective as defined by the NCP:

- Excavate contaminated soil and sewer line sediments and dispose of at an off-site facility

- Limited Modification of the Building

The recommended action is considered a source control operable unit remedial measure as defined in section 300.68(e) of the proposed changes to the NCP. The objective of the action is to remove the source of continued contaminant migration from the site. This includes cadmium and chromium contaminated soils, sewer sediments including the sewer line, and residuals in the building. The RI/FS study is continuing and will determine if additional remedial actions are needed to address the groundwater contamination and develop the appropriate level of cleanup.

The evaluation of alternatives for source control measures determined that off-site disposal of the hazardous wastes is more cost-effective than other feasible on-site alternatives. On-site disposal would require a RCRA cap or RCRA landfill. Each of these is more costly than off-site disposal with no additional protection.

The capital cost of this alternative is approximately $75,000. The State of Michigan agrees to contribute ten percent of the source control operable unit costs. Long-term monitoring needs will be determined at the completion of the RI/FS.

Schedule

- Approve Remedial Action (Sign ROD) 9/6/85
- Award Cooperative Agreement RD/RA (Advance Match) 9/6/85
- Start Design 9/85

- Complete Design	3/86
- Start Construction	6/86
- Complete Construction	8/86

Future Actions

Additional field work will be conducted during the continued RI to determine the vertical and horizontal extent of contamination to the groundwater. The Feasibility Study should be completed by March 1986.

Community Relations Responsiveness Summary
Northernaire Plating Company
Cadillac, Michigan

INTRODUCTION

This "Community Relations Responsiveness Summary" documents citizen concerns and issues raised during the planning and preparation of the Focused Feasibility Study (FFS) for an operable unit remedial action at Northernaire Plating Company, Cadillac, Michigan. It also documents, for the public record, the U.S. Environmental Protection Agency's (USEPA) response to the comments presented during the public comment period on the Focused Feasibility Study.

CONCERNS RAISED DURING COMMENT PERIOD

The FFS was completed on July 19, 1985. Copies of the FFS were made available to the public on July 22, 1985. A public meeting was held in the Cadillac Municipal Complex Council Chambers. Approximately 25 residents attended the meeting. Although the attendees had several questions and showed interest, written comments were not submitted at the meeting. The comment period closed on August 12, 1985.

The Agency subsequently received two written comments regarding the proposed alternative for the building and disposition of the sewer line. The comments were submitted by the City of Cadillac. These issues are addressed below.

ISSUE: Recommended Alternative for the Building

COMMENT: The soil under the building cannot be properly evaluated and excavated without total removal of the building and slab with off-site disposal.

RESPONSE: Demolition of the building was considered as an alternative. The EPA and the MDNR have the opinion that if the building is useable, it can provide a source of income and should remain in place. There is no certainty the soil under the building is contaminated, but if it is, we are confident that the excavation can be successfully accomplished without razing the building.

COMMENT: The sanitary sewer is serving Northernaire and an adjacent building and if removed should be replaced with alternative sewage.

RESPONSE: Northernaire is not currently connected to the sewer. It is uncertain if the adjacent building is connected to this particular line and in fact, if the sewer is in useable condition. The sewer is a private line installed by the owner of the site property. It is assumed installation occurred at the same time the sewer line connection to the building was installed. The sewer line connection to the Northeraire building was removed during the immediate removal conducted by the U.S. EPA because of poor construction, leaks, and improper installation. It is anticipated the stretch of sewer in question leading into the City sewer main was laid with the same construction practices and so is not useable. If, during excavation, the sewer line is found to be in serviceable condition or necessary to the adjacent building, this decision will be reevaluated.